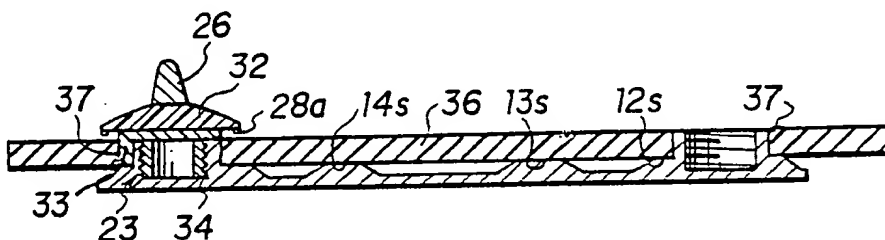




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(54) Title: REMOVABLE SHOE SPIKE LOCKABLE TO CONFIGURED SOLE PLATE
**(57) Abstract**

A spike shoe construction including a socket (17-23) carrying ribbed insert mounted on and spaced from an outer sole (36) with each socket (17-23) carrying reusable lock means (41) for locking spikes (26) installed in the socket (17-23). Each spike (26) in turn carries a lock means (33) which is non-reusable in that it is so distorted or broken when removed to render it inoperative.

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REMOVABLE SHOE SPIKE LOCKABLE TO CONFIGURED SOLE PLATEBackground of the Invention

Plastic spikes for golf and other spiked shoes have been in use for a number of years (See U. S. Patent No. 4,587,748). Sole inserts made of plastic for supporting spikes have also been used.

Sole insert and spike systems as structural components in shoe construction, as well as having the capacity of holding plastic spikes in position during service have included a number of drawbacks.

Summary of the Invention

Briefly, the present invention is a shoe sole construction including a configured lightweight socket bearing insert having reinforcing means around the sockets and strengthening ribs between the sockets. Spikes are installed into the sockets using locking means on both the sockets and the spikes which locking means on the spike are deformable or frangible or both to allow removal of the spike after it has been installed in lock position.

It is a feature of the invention that inserts, spikes and sockets are made of plastic for lightweight, flexibility and deformability.

Brief Description of the Invention

Fig. 1 is a plan view of a sole plate insert having spike-receiving sockets with one spike installed;

Fig. 2 is a section taken along line 2-2 of Fig. 1 with a portion of the outer shoe sole positioned adjacent the plate insert;

Fig. 3 is an elevational view of a pike;

Fig. 4 is an elevational view of a spike in the process of being initially positioned on the socket;

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Fig. 5 is an elevational view of the spike having been rotated further with the spike locking tab being deflected by socket ribs;

Fig. 6 is an elevational view of the spike with the locking tabs having passed the socket ribs; and

Fig. 7 is an elevational view of the spike having been rotated in the opposite direction for removal with locking tabs sheared.

Description of the Preferred Embodiment

Referring to Figs. 1-3, molded plastic shoe insert 10 includes thin body 11, three (3) dumbbell-shaped rib portions 12, 13 and 14, and circular raised portion 16. Formed as part of the rib portions 12, 13, 14 are threaded sockets 17, 18, 19, 20, 21, 22 and 23. Rib portions 12, 13, and 14 have generally circular reinforcing elements 17a, 18a, 19a, 20a, 21a, and 22a positioned around the respective sockets. Rib portions 12, 13, and 14 also include rib crosspieces 12b, 13b and 14b. Also shown is shoe spike-carrying unit 26 including metal spike pin 27 with metal base 28 and plastic cap 29. Plastic cap 29 has two (2) wrench-receiving holes 30a, 30b for receiving a tool to screw spike 26 in to install for use and screw it out for removal and replacement.

Turning in particular to Figs. 1 and 2, the dumbbell rib construction of sole plate 10 permits plate body 11 to be made thinner than a sole without such construction. The present construction provides for a lighter weight and more flexible sole plate. Ribs 12, 13 and 14 also provide spaced-apart support surfaces for a rubber, leather (or other material) outer shoe sole 36 (Fig. 2). The spacing between outer sole socket receiving holes 37 permits relative movement between sole 36 and insert 10. Such relative movement is accomplished with less required forces as compared with a flat non-rib insert plate

-3-

surface thus providing more flexibility to sole construction.

Turning to Fig. 4, spike 26 is shown in its initial step of being screwed into socket 23. Socket 23 which extends upwardly from circular raised portion 16 includes spaced-apart upstanding socket side projections 41 having slanted upper cam surfaces 41a and vertical non-cam surfaces 41b. Spike element 26 carries circular skirt 28 with flexible frangible lock tongues 33 depending in spaced manner from skirt 28. The original shape of lock tongue 33 includes cam surface 33a and vertical non-cam surface 33b. When spike 26 is initially being screwed into socket 23 skirt 28 and the top rim 23a of socket 23 are spaced apart. In Fig. 4, as spike 26 is screwed on in the direction of the arrow, lock tongues 33 just clear upstanding side rib 41. In Fig. 5 after spike 26 has been screwed on further and spike skirt 32 is just above the upper rim 23a of socket 23, lock tongues 33 are forced to be deformed by camming action of upstanding projection cam surfaces 41a. With further turning the lock tongues 33 pass the ribs 41 and restore themselves to some extent to their original shape (Fig. 5). Spike 26 is turned until skirt 32 engages socket upper rim 23a or until the spike 26 is otherwise tightly held in place. Each expendable tongue 33 will in this installation process pass against, be deformed by, and pass by a number of socket projections 41 a distance X' from rim 23a. The interference between projections 41 and tongues 33 as spike 26 is urged to be turned holds spike 26 in place during shoe use.

When replacement of spike 26 is desired, a wrench is used to turn the spike in the opposite direction (arrow of Fig. 6). Since the tongue vertical side 33b is presented to the vertical non-cam side 41b of the projection 41, a portion of tongue 33 will shear off leaving tongue stump 33s

-4-

which stump 33s can clear the projections 41 and permit removal of the spike 26.

It is also contemplated that the depending
tongues may be made of selected materials and so shaped such
5 that the tongues will undergo distortion as the spike is
installed and when the spike is removed will undergo
additional distortion without shearing or breaking.

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I Claim:

1. A shoe sole construction for shoes with removable spikes comprising

- 5 a. an outer sole with a plurality of spaced-apart socket-receiving holes;
- b. a thin sole insert carrying spike sockets for positioning in such sole holes; reinforcing circular portions
10 around the sockets and in engagement with the outer sole and reinforcing ribs engaging the outer sole and extending between sockets;
- c. spike elements positioned in the sockets, each spike element having a
15 first reusable lock means thereon;
- d. second non-reusable lock means on the spike elements sized and shaped to locking engagement with the first lock
20 means which second lock means is deformed, broken or otherwise spent upon disengagement from the first lock means as the spike element is removed.

25 2. A shoe spike and socket arrangement for accomplishing installation in the socket and removal of the spike-carrying element from the socket comprising

- a. a socket mounted in the shoe;
- b. a complementary spike element having a
30 pin mounted cap, a skirt body and a socket engageable portion;
- c. at least one first lock means on the socket element;

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- d. at least one deflectable and distortional second lock means on the spike

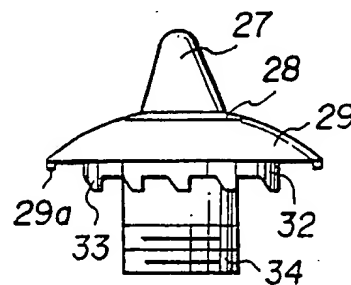
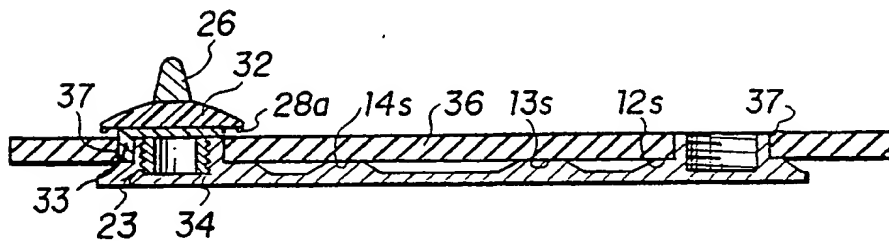
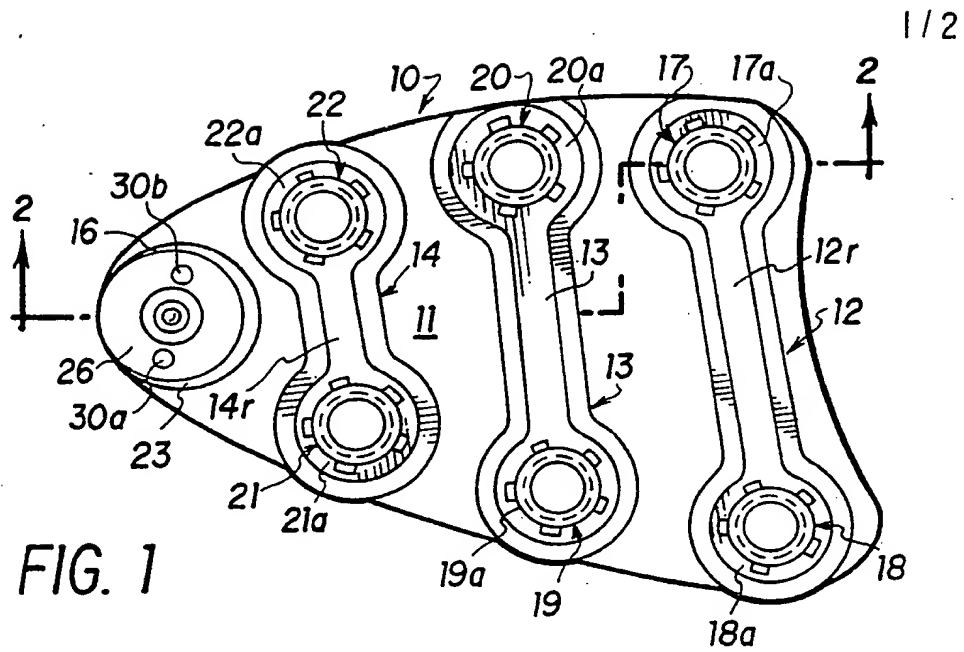
5 the second lock means being
positioned and shaped so that as
the spike element is installed to
engage the socket the second lock
means deforms to reach a position
10 of locking engagement with the
first lock means and so that as the
spike element is removed further
deflection and distortion take
place.

15 3. The shoe spike and socket arrangement of
claim 2 in which the first lock means is a plurality of
spaced-apart projection means and the second lock means is a
plurality of tongues means depending from the spike element
skirt body
20

4. The shoe spike and socket arrangement of
claim 3 in which the first lock means has cam means and
non-cam means thereon to permit the second lock means to
pass the first lock means with a first resistance as the
25 spike element is installed and to permit the second lock
means to pass the first lock means during spike element
removal which will create a second resistance which second
resistance is greater than the first resistance.

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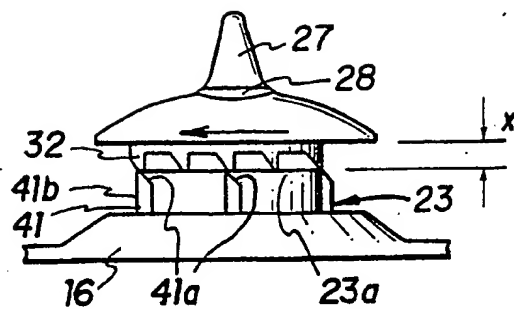


FIG. 4

FIG. 5

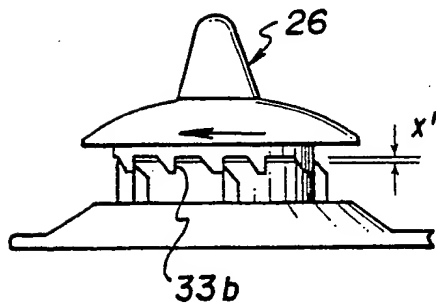
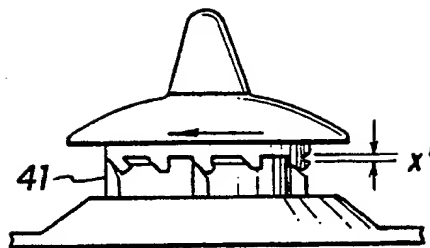
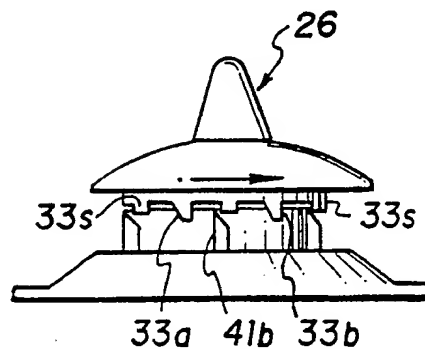


FIG. 6

FIG. 7



INTERNATIONAL SEARCH REPORT

International Application No. PCT/US88/04 183

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC US. 36/134, 127, 67D INT CL. (4) A43B 05/00 A43C 15/16																																			
II. FIELDS SEARCHED <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Minimum Documentation Searched ⁷</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; text-align: left; border-bottom: 1px solid black;">Classification System</th> <th style="text-align: left; border-bottom: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">U.S.</td> <td style="padding: 5px;">36/134, 127, 128, 67R, 67A, 67D, 65</td> </tr> </table> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸</div>			Classification System	Classification Symbols	U.S.	36/134, 127, 128, 67R, 67A, 67D, 65																													
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹ <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; text-align: left; border-bottom: 1px solid black;">Category *</th> <th style="text-align: left; border-bottom: 1px solid black;">Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²</th> <th style="text-align: left; border-bottom: 1px solid black;">Relevant to Claim No. ¹³</th> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">Y</td> <td style="padding: 5px;">US,A, 4,587,748 COLLINS 13 May 1986 see entire reference</td> <td style="padding: 5px;">1-4</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">Y</td> <td style="padding: 5px;">US,A, 2,784,503 ANDERSON 12 March 1957 see entire reference</td> <td style="padding: 5px;">1-4</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">Y</td> <td style="padding: 5px;">US,A, 2,774,151 DAHLQUIST ET AL 18 December 1956 see entire reference</td> <td style="padding: 5px;">1</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">Y</td> <td style="padding: 5px;">US,A, 2,292,299 SMITH 4 August 1942 see entire reference</td> <td style="padding: 5px;">3-4</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">A/P</td> <td style="padding: 5px;">US,A, 4,723,366 HAGGER 9 February 1988</td> <td></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">A</td> <td style="padding: 5px;">US,A, 4,648,187 DASSLER ET AL 10 March 1987</td> <td></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">A</td> <td style="padding: 5px;">US,A, 3,328,901 STRICKLAND 4 July 1967</td> <td></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">A</td> <td style="padding: 5px;">US,A, 2,276,887 SMITH 17 March 1942</td> <td></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">A</td> <td style="padding: 5px;">US,A, 2,223,794 PIERCE ET AL 3 December 1940</td> <td></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">A</td> <td style="padding: 5px;">US,A, 1,768,426 STELZER 24 June 1930</td> <td></td> </tr> </table> <div style="margin-top: 10px;"> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div> </div>			Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	Y	US,A, 4,587,748 COLLINS 13 May 1986 see entire reference	1-4	Y	US,A, 2,784,503 ANDERSON 12 March 1957 see entire reference	1-4	Y	US,A, 2,774,151 DAHLQUIST ET AL 18 December 1956 see entire reference	1	Y	US,A, 2,292,299 SMITH 4 August 1942 see entire reference	3-4	A/P	US,A, 4,723,366 HAGGER 9 February 1988		A	US,A, 4,648,187 DASSLER ET AL 10 March 1987		A	US,A, 3,328,901 STRICKLAND 4 July 1967		A	US,A, 2,276,887 SMITH 17 March 1942		A	US,A, 2,223,794 PIERCE ET AL 3 December 1940		A	US,A, 1,768,426 STELZER 24 June 1930	
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